



# EMC TEST REPORT

Report No: STS1702076E01

Issued for

SHENZHEN ANYSECU TECHNOLOGY Co., LTD  
Building 1, 4th floor, F1 financial services technology  
innovation base, kefa Road #8, Nanshan District,  
Shenzhen, China

<b>Product Name:</b>	IP Handheld Radio
<b>Brand Name:</b>	ANYSECU
<b>Test Model Name:</b>	G22+
<b>Series Model:</b>	G22+, G25, G68
<b>Test Standard:</b>	ETSI EN 301 489-1 V1.9.2
	ETSI EN 301 489-3 V1.6.1
	ETSI EN 301 489-7 V1.3.1
	ETSI EN 301 489-17 V2.2.1
	ETSI EN 301 489-24 V1.5.1

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**TEST REPORT CERTIFICATION**

**Applicant's name**.....: SHENZHEN ANYSECU TECHNOLOGY Co., LTD  
**Address**.....: Building 1, 4th floor, F1 financial services technology innovation base, kefa Road #8, Nanshan District, Shenzhen, China  
**Manufacturer's Name** .....: SHENZHEN ANYSECU TECHNOLOGY Co., LTD  
**Address**.....: Building 1, 4th floor, F1 financial services technology innovation base, kefa Road #8, Nanshan District, Shenzhen,China

**Product description**

**Product name**.....: IP Handheld Radio  
**Model and/or type reference** : G22+, G22+, G25, G68  
 ETSI EN 301 489-1 V1.9.2 (2011-09)  
 ETSI EN 301 489-3 V1.6.1 (2013-08)  
**Standards** .....: ETSI EN 301 489-7 V1.3.1 (2005-11)  
 ETSI EN 301 489-17 V2.2.1 (2012-09)  
 ETSI EN 301 489-24 V1.5.1 (2010-10)

This device described above has been tested by STS, and the test results show that the equipment under test (EUT) is in compliance with the 1999/5/EC R&TTE Directive Art.3.1b requirements. And it is applicable only to the tested sample identified in the report.

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**Date of Test** .....:  
**Date (s) of performance of tests** .....: 17 Feb. 2017 ~ 05 Mar. 2017  
**Date of Issue** .....: 06 Mar. 2017  
**Test Result**.....: **Pass**

Testing Engineer : *Eric Liu*  
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 (Eric Liu)

Technical Manager : *Alan Cao*  
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 (Alan Cao)

Authorized Signatory : *Bovey Yang*  
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 (Bovey Yang)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	06 Mar. 2017	STS1702076E01	ALL	Initial Issue

Note: **Format version** of the report -V01





## 1. TEST SUMMARY

Test procedures according to the technical standards:

ETSI EN 301 489-1 V1.9.2 (2011-09)

ETSI EN 301 489-3 V1.6.1 (2013-08)

ETSI EN 301 489-7 V1.3.1 (2005-11)

ETSI EN 301 489-17 V2.2.1 (2012-09)

ETSI EN 301 489-24 V1.5.1 (2010-10)

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN 55022:2010/AC:2011	Conducted Emission On AC And Telecom Port 150kHz to 30MHz	Class B	PASS	
	Radiated Emission 30MHz to 1000MHz	Class B	PASS	
	Radiated Emission 1GHz to 6GHz	Class B	PASS	
EN61000-3-2:2014	Harmonic Current Emission	Class A	N/A	
EN 61000-3-3:2013	Voltage Fluctuations & Flicker	-----	PASS	
EMC Immunity				
Section EN 55024:2010	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2:2009	Electrostatic Discharge	B	PASS	
EN 61000-4-3:2006+A1:2008 +A2:2010	RF electromagnetic field	A	PASS	
EN 61000-4-4:2012	Fast transients	B	PASS	
EN 61000-4-5:2014	Surges	B	PASS	
EN 61000-4-6:2014/AC:2015	Injected Current	A	PASS	
EN 61000-4-11:2004	Volt. Interruptions Volt. Dips	B / C / C / C NOTE (3)	PASS	

Note: (1) "N/A" denotes test is not applicable in this Test Report

(2) The power consumption of EUT is less than 75W and no Limits apply.

(3) Voltage dip: 100% reduction – Performance Criteria **B**

Voltage dip: 30% reduction – Performance Criteria **C**

Voltage dip: 40% reduction – Performance Criteria **C**

Voltage Interruption: 100% Interruption – Performance Criteria **C**

For ETSI EN 301 489-3 The EUT is Type 1 SRD equipment. Performance criteria A for immunity tests with phenomena of a continuous nature; Performance criteria B for immunity tests with phenomena of a transient nature;

(4) For client's request and manual description, the test will not be executed.



## 1.1 TEST FACTORY

Company Name:	Shenzhen STS Test Services Co. Ltd.
Address:	1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China
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Registration No.:	FCC Registration No.: 842334; IC Registration No.: 12108A-1

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

### A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
STSC01	ANSI	9KHz-150KHz	2.88	
		150 KHz ~ 30MHz	2.67	

### B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
STSC02	ANSI	30MHz ~ 200MHz	2.83	
		200MHz ~ 1000MHz	2.94	
		1GHz ~ 6 GHz	3.03	



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	IP Handheld Radio
Trade Name	ANYSECU
Model Name	G22+
Series Model	G22+, G25, G68
Model Difference	Only different in model name
Frequency Band	GSM 900: 880.2 MHz to 914.8 MHz GSM1800: 1710.2 MHz to 1784.8 MHz WCDMA Band I: 1920 MHz to 1980 MHz Bluetooth: 2402 MHz to 2480 MHz WI-FI IEEE 802.11 b/g/n20: 2412 MHz to 2472 MHz WI-FI IEEE 802.11 n40: 2422 MHz to 2462 MHz GPS: 1.57542GHz
Modulation Mode	GSM / DCS: GMSK+8PSK WCDMA(HSUPA/HSDPA): QPSK/16QAM IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: DSSS (CCK, DQPSK,DBPSK)+OFDM (QPSK, BPSK, 16-QAM, 64-QAM) IEEE 802.11n: OFDM(MCS 0-7) Bluetooth: GFSK, $\pi/4$ -DQPSK, 8DPSK GPS: BPSK
Description test modes	SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 is used to tested.
Power Rating	DC 3.7V from battery
Adapter	Power supply and ADP(rating): Input: AC 100V-240V, 50/60Hz, 200mA Output: DC 5V, 1000mA
Battery	Battery(rating): Rated Voltage: 3.7V Charge Limit: 4.2V Capacity: 3500mAh
Antenna	GSM/WCDMA: Dipole BT/WIFI/GPS: PIFA
Connecting I/O Port(s)	USB port*1
Hardware version number	KH7218MB_V2.1
Software version number	F22_EN_V002



## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	WCDMA Band I
Mode 2	WIFI Mode
Mode 3	GSM 900 Mode
Mode 4	GPRS 900 Mode
Mode 5	EDGE 900 Mode
Mode 6	GPS
Mode 7	BT Mode
Mode 8	FM mode
Mode 9	USB Mode
Mode 10	GSM 1800 Mode
Mode 11	GPRS 1800 Mode
Mode 12	EDGE 1800 Mode
Mode 13	Play music mode
Mode 14	Camera mode

For Conducted Test	
Final Test Mode	Description
Mode 7	BT Mode

For Radiated Test	
Final Test Mode	Description
Mode 9	USB Mode

For EMS Test	
Final Test Mode	Description
Mode 1	WCDMA Band I
Mode 2	WIFI Mode
Mode 3	GSM 900 Mode
Mode 4	GPRS 900 Mode
Mode 5	EDGE 900 Mode
Mode 6	GPS
Mode 7	BT Mode
Mode 8	FM mode
Mode 9	USB Mode

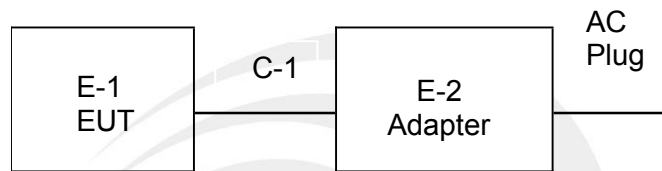




Mode 10	GSM 1800 Mode
Mode 11	GPRS 1800 Mode
Mode 12	EDGE 1800 Mode
Mode 13	Play music mode
Mode 14	Camera mode

Note: The test modes were carried out for all operation modes(include link and idle).  
The final test mode of the EUT was the worst test mode for Mode 7 and Mode 9, and its test data was showed.

### 2.3 DESCRIPTION OF TEST SETUP





## 2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-1	IP Handheld Radio	ANYSEC U	G22+	N/A	EUT
E-2	Adapter	N/A	D12-501000E	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
C-1	Shielded	NO	90cm	/

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.



## 2.5 MEASUREMENT INSTRUMENTS LIST

### 2.5.1 TEST SITE

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
EMI Test Receiver	R&S	ESPI	102086	2016.10.23	2017.10.22
EMI Test Receiver	R&S	ESCI	101427	2016.10.23	2017.10.22
LISN	R&S	ENV216	101242	2016.10.23	2017.10.22
LISN	EMCO	3810/2NM	000-23625	2016.10.23	2017.10.22
Absorbing clamp	R&S	MDS-21	100668	2016.10.23	2017.10.22
Bilog Antenna	TESEQ	CBL6111D	34678	2014.11.24	2017.11.23
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1343	2015.03.05	2018.03.04
Power Amplifier	Agilent	8449B	60538	2016.10.23	2017.10.22
Spectrum Analyzer	Agilent	E4407B	MY50140340	2016.10.23	2017.10.22
Harmonic Voltage & Flicker	LAPLACE	AC 2000A	311217	2016.10.23	2017.10.22
AC Power Source	MTONI	PHF-5010	631169	2016.10.23	2017.10.22
ESD TEST GENERATOR	HTEC	HESD30	143802	2016.10.23	2017.10.22
Surger Generator	HTEC	HCWG71	143804	2016.10.23	2017.10.22
Surger Generator	HTEC	SCDN161P	143805	2016.10.23	2017.10.22
VOLTAGE DIPS INTERRUPTIONS Generator	HTEC	HPFS 161P	143803	2016.10.23	2017.10.22
EFT/B Generator	HTEC	HEFT 51	143801	2016.10.23	2017.10.22
Signal Generator	R&S	SMF100A	104260	2016.10.23	2017.10.22
Log-Bicon Antenna	Schwarzbeck	VULB9161	4022	2016.08.13	2017.08.12
Power Amplifier	AR	150W1000M1	320946	2016.09.21	2017.09.20
Microwave Horn Antenna	AR	AT4002A	321467	2016.06.10	2017.06.09
Power Amplifier	AR	25S1G4A	308598	2016.09.21	2017.09.20
Universal Radio Communication Tester	R&S	CMU200	111764	2016.10.23	2017.10.22
Audio Analyzer	R&S	UPV	100419	2016.03.07	2017.03.06
CS	SCHLODER	CDG-6000-25	126A1280/2014	2016.10.23	2017.10.22
CDN	SCHLODER	CDN-M2+3	A2210275/2014	2016.10.23	2017.10.22
EM Clamp	FCC	F-203I-23MM	504	2016.10.23	2017.10.22
Attenuator	HTEC	ATT-6DB-100	A100W224	2016.10.23	2017.10.22
Audio Power Amplifier	B&K	2716-C-001	2610976	2016.03.07	2017.03.06



Mouth Simulator	B&K	4227	2630621	2016.03.07	2017.03.06
Sound Calibrator	B&K	4231	2637486	2016.03.07	2017.03.06
1/2" Pressure-field Microphone	B&K	4192	2641678	2016.03.07	2017.03.06
Ear Simulator for Telephonometry	B&K	4185	2553612	2016.03.07	2017.03.06
Telephone Test Head	B&K	4185	2631728	2016.03.07	2017.03.06
Universal Radio Communication Tester	R&S	CMU200	111764	2016.10.23	2017.10.22
Audio Analyzer	R&S	UPV	100419	2016.03.07	2017.03.06
MF Generator	HTEC	HMFG-COMB	143903	2016.10.23	2017.10.22
Magnetic field coil	HTEC	HCOIL 100	143808	2016.10.23	2017.10.22
Band Pass Filter	COM-MW	ZBSF-1920-1980-0092	N/A	2016.10.23	2017.10.22
Band Pass Filter	COM-MW	ZBSF-C836.5-25-706	N/A	2016.10.23	2017.10.22
Band Pass Filter	COM-MW	ZBSF-C897.5-35-707	N/A	2016.10.23	2017.10.22
Band Pass Filter	COM-MW	ZBSF-C1747.5-75-708	N/A	2016.10.23	2017.10.22
Band Pass Filter	COM-MW	ZBSF-C1880-60-709	N/A	2016.10.23	2017.10.22
Band Pass Filter	COM-MW	ZBSF-C2550-70-710	N/A	2016.10.23	2017.10.22



### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

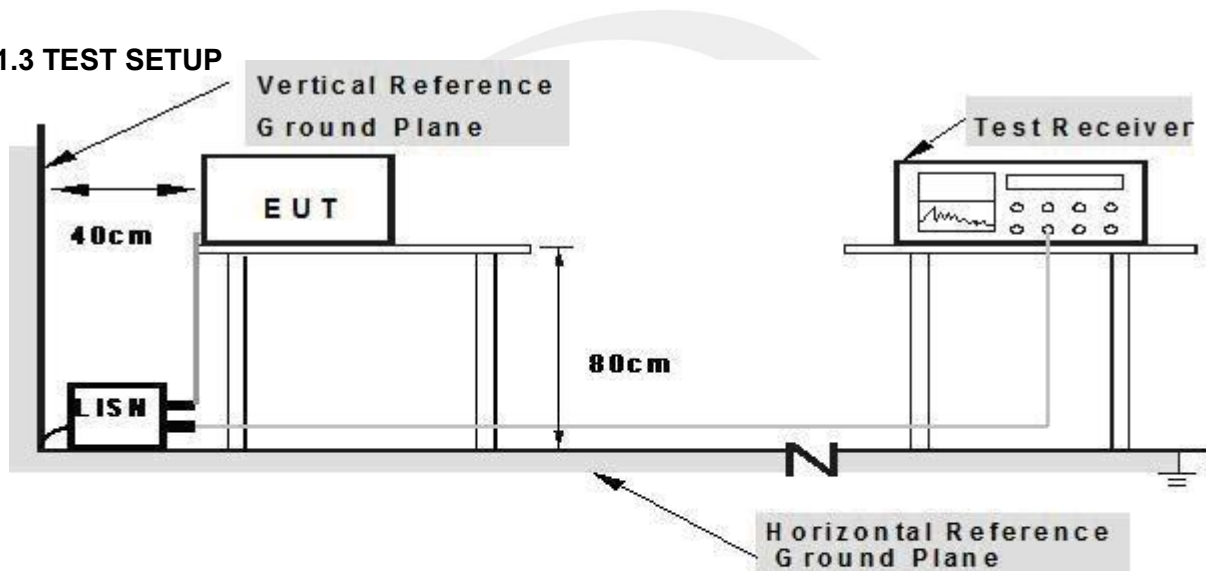
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

### 3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.1.3 TEST SETUP



**Note: 1. Support units were connected to second LISN.**

**2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes**

### 3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



### 3.1.5 TEST RESULTS

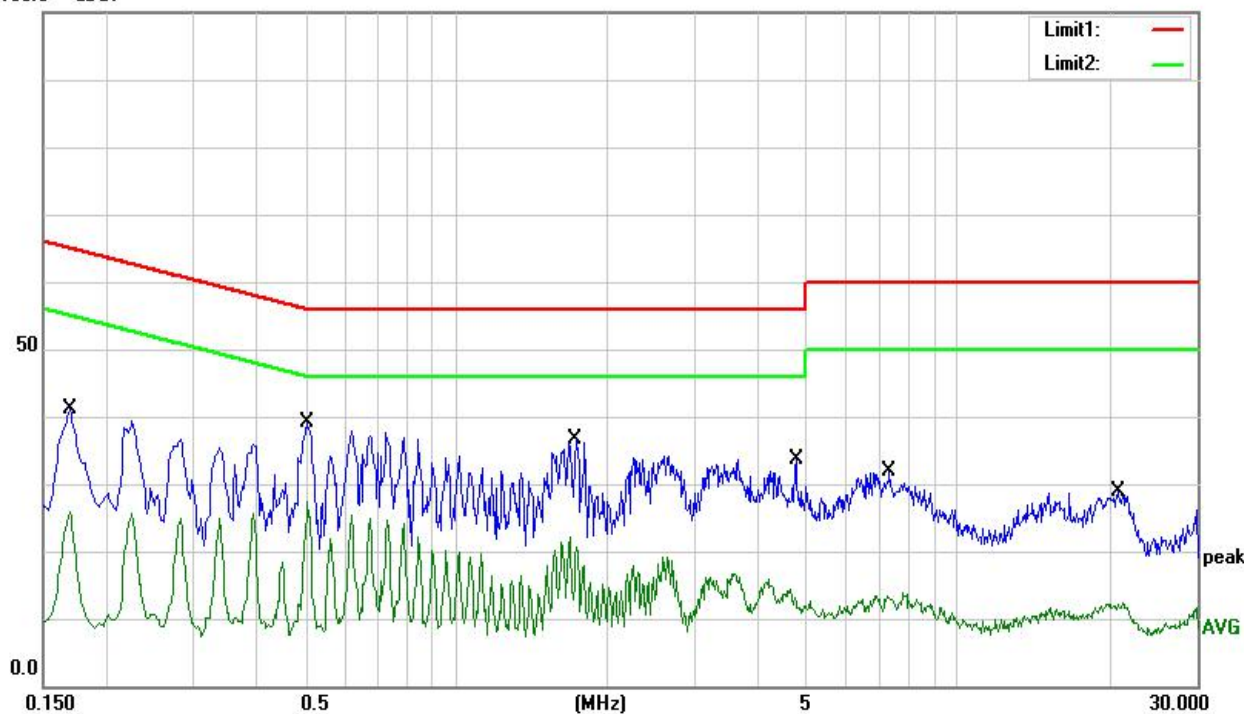
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	L
Test Voltage:	AC 230V/50Hz	Test Mode:	Mode 7

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1700	31.90	9.23	41.13	64.96	-23.83	QP
2	0.1700	16.60	9.23	25.83	54.96	-29.13	AVG
3	0.5020	30.08	9.14	39.22	56.00	-16.78	QP
4	0.5020	18.22	9.14	27.36	46.00	-18.64	AVG
5	1.7380	27.40	9.22	36.62	56.00	-19.38	QP
6	1.7380	11.30	9.22	20.52	46.00	-25.48	AVG
7	4.7700	24.42	9.27	33.69	56.00	-22.31	QP
8	4.7700	2.27	9.27	11.54	46.00	-34.46	AVG
9	7.3100	22.47	9.30	31.77	60.00	-28.23	QP
10	7.3100	3.92	9.30	13.22	50.00	-36.78	AVG
11	20.8660	18.96	9.92	28.88	60.00	-31.12	QP
12	20.8660	2.26	9.92	12.18	50.00	-37.82	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit

100.0 dBuV





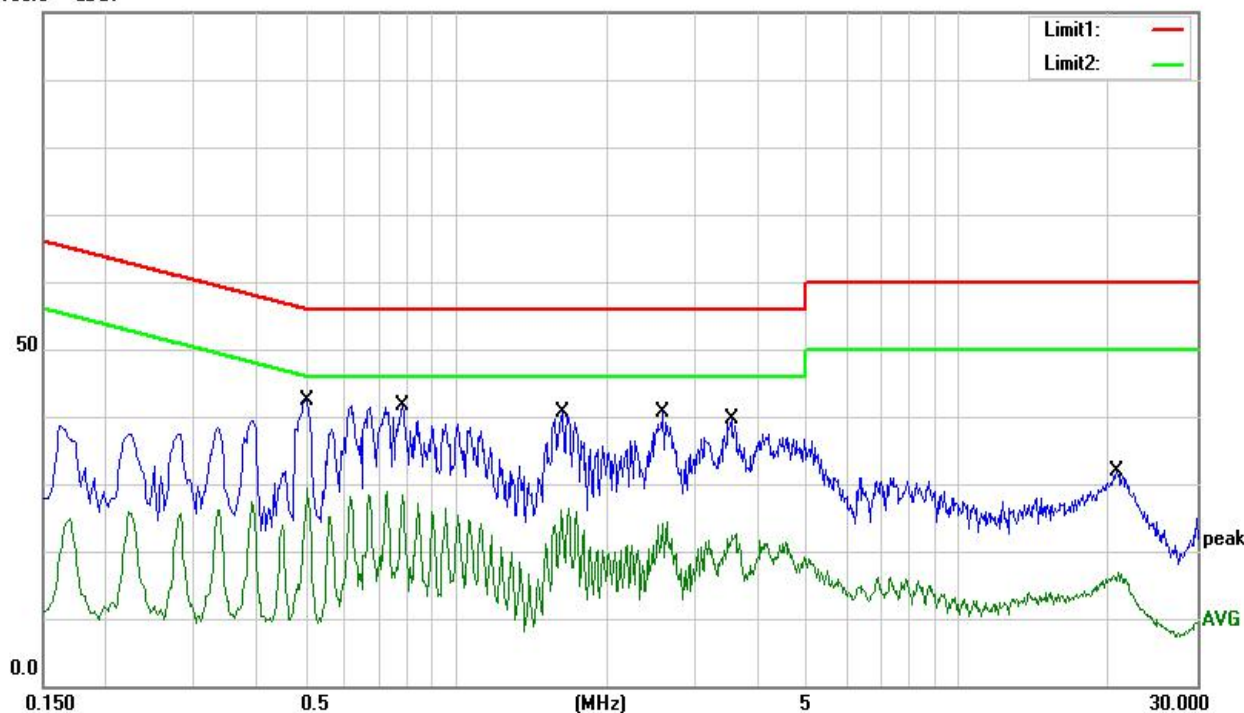
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	N
Test Voltage:	AC 230V/50Hz	Test Mode:	Mode 7

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5020	33.24	9.14	42.38	56.00	-13.62	QP
2	0.5020	20.34	9.14	29.48	46.00	-16.52	AVG
3	0.7820	32.44	9.21	41.65	56.00	-14.35	QP
4	0.7820	19.28	9.21	28.49	46.00	-17.51	AVG
5	1.6300	31.34	9.21	40.55	56.00	-15.45	QP
6	1.6300	10.73	9.21	19.94	46.00	-26.06	AVG
7	2.5820	31.36	9.26	40.62	56.00	-15.38	QP
8	2.5820	14.98	9.26	24.24	46.00	-21.76	AVG
9	3.5340	30.47	9.26	39.73	56.00	-16.27	QP
10	3.5340	13.00	9.26	22.26	46.00	-23.74	AVG
11	20.7900	21.90	9.92	31.82	60.00	-28.18	QP
12	20.7900	5.71	9.92	15.63	50.00	-34.37	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit

100.0 dBuV







### 3.2 RADIATED EMISSION MEASUREMENT

#### 3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	Class A		Class B	
	At 10m	At 3m	At 10m	At 3m
	dBuV/m	dBuV/m	dBuV/m	dBuV/m
30 – 230	40	50	30	40
230 – 1000	47	57	37	47

#### 3.2.2 LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (at 3m) dBuV/m		Class B (at 3m) dBuV/m	
	Peak	Avg	Peak	Avg
1000-3000	76	56	70	50
3000-6000	80	60	74	54

Notes:

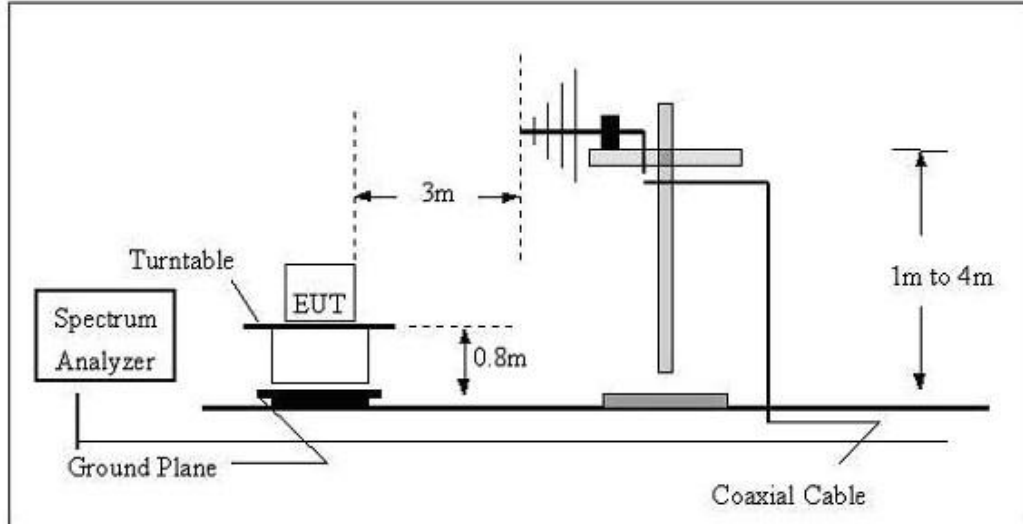
- (1) The limit for radiated test was performed according to: CISPR 22.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

#### 3.2.3 TEST PROCEDURE

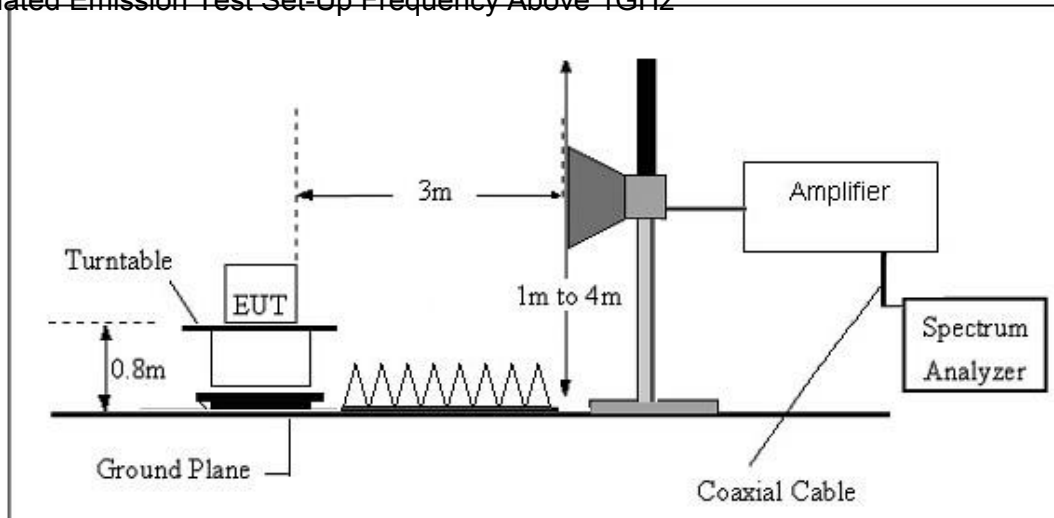
- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT TestPhotos.

### 3.2.4 TEST SETUP

#### (A) Radiated Emission Test Set-Up Frequency Below 1 GHz



#### (B) Radiated Emission Test Set-Up Frequency Above 1GHz



### 3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



### 3.2.6 TEST RESULTS(30 - 1000 MHz)

Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	AC 230V/50Hz	Test Mode:	Mode 9

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	47.3255	43.21	-20.10	23.11	40.00	-16.89	QP
2	151.5972	45.28	-18.05	27.23	40.00	-12.77	QP
3	188.4125	39.17	-20.13	19.04	40.00	-20.96	QP
4	271.3246	38.54	-15.52	23.02	47.00	-23.98	QP
5	408.9460	37.77	-11.08	26.69	47.00	-20.31	QP
6	774.1584	31.02	-3.25	27.77	47.00	-19.23	QP

**Remark:**

1. All readings are Quasi-Peak.
2. Margin = Result (Result =Reading + Factor )-Limit



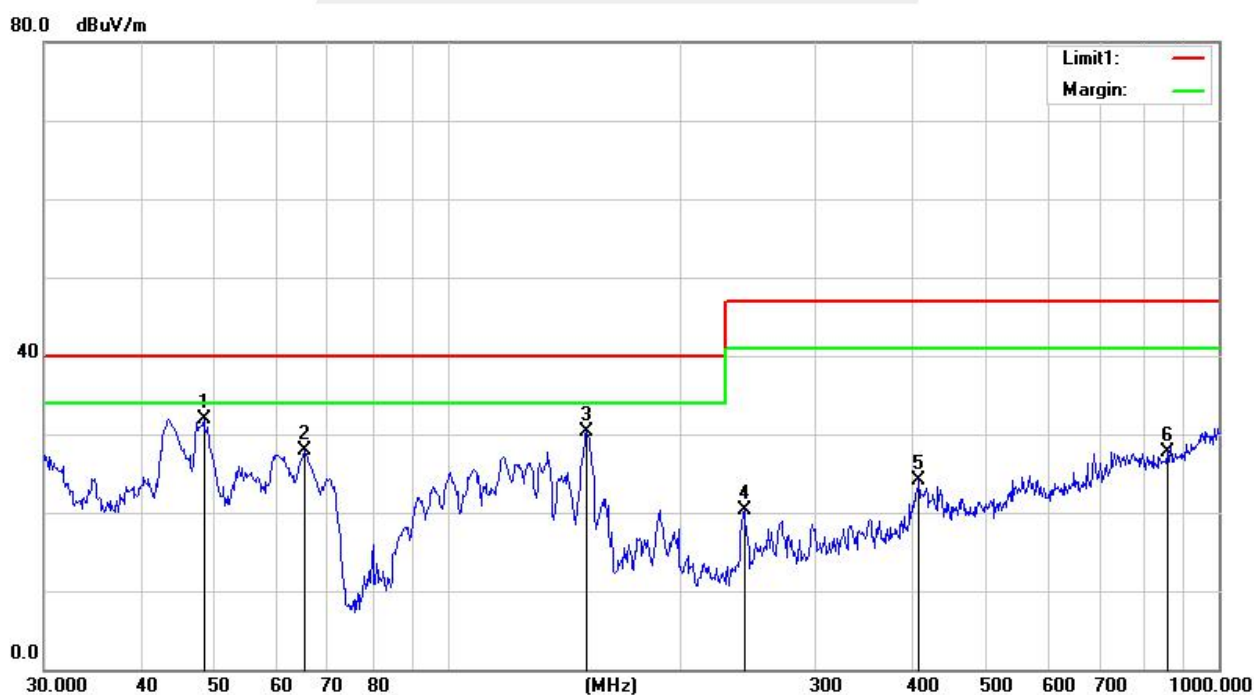


Temperature:	26°C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	AC 230V/50Hz	Test Mode:	Mode 9

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	48.3318	52.57	-20.62	31.95	40.00	-8.05	QP
2	65.3432	52.14	-24.21	27.93	40.00	-12.07	QP
3	151.5972	48.44	-18.05	30.39	40.00	-9.61	QP
4	242.5253	37.79	-17.40	20.39	47.00	-26.61	QP
5	408.9460	35.10	-11.08	24.02	47.00	-22.98	QP
6	860.0352	30.49	-2.69	27.80	47.00	-19.20	QP

Remark:

- 1. All readings are Quasi-Peak.
- 2. Margin = Result (Result =Reading + Factor)–Limit



**3.2.7 TEST RESULT (1000 - 6000 MHz)**

Temperature:	24°C	Relative Humidity:	54%
Pressure:	1010hPa	Test Mode:	Mode 9
Test Power:	AC 230V/50Hz		

Freq. (MHz)	Reading (dBUV)	Corr.Factor (dB)	Measured (dBUV/m)	Limits (dBUV/m)	Margins (dBUV/m)	Ant. H/V	Mark
1802.35	72.14	-10.98	61.16	70.00	-8.84	V	PK
1802.35	52.03	-10.98	41.05	50.00	-8.95	V	AVG
2253.01	67.89	-10.54	57.35	70.00	-12.65	V	PK
2253.01	50.01	-10.54	39.47	50.00	-10.53	V	AVG
1896.56	68.23	-11.52	56.71	70.00	-13.29	H	PK
1896.56	49.67	-11.52	38.15	50.00	-11.85	H	AVG
2311.42	65.49	-10.08	55.41	70.00	-14.59	H	PK
2311.42	47.26	-10.08	37.18	50.00	-12.82	H	AVG

Remark:

Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit



**3.3 HARMONICS CURRENT**

**3.3.1 LIMITS OF HARMONICS CURRENT**

IEC 555-2					
Table - I			Table - II		
Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Amperes)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Amperes)
Non Portable Tools or TV Receivers	Odd Harmonics		TV Receivers	Odd Harmonics	
	3	2.30		3	0.80
	5	1.14		5	0.60
	7	0.77		7	0.45
	9	0.40		9	0.30
	11	0.33		11	0.17
	13	0.21		13	0.12
	15 ≤ n ≤ 39	0.15 · 15/n		15 ≤ n ≤ 39	0.10 · 15/n
	Even Harmonics			Even Harmonics	
	2	1.08		2	0.30
4	0.43	4	0.15		
8	0.30				
8 ≤ n ≤ 40	0.23 · 8/n	DC	0.05		

EN 61000-3-2/IEC 61000-3-2					
Equipment Category	Max. Permissible Harmonic Current (in Amperes)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in A) (mA/w)	
Class A	Same as Limits Specified in 4-2.1, Table - I, but only odd harmonics required	Class D	3	2.30	3.4
			5	1.14	1.9
			7	0.77	1.0
			9	0.40	0.5
			11	0.33	0.35
			13 ≤ n ≤ 39	see Table I	3.85/n

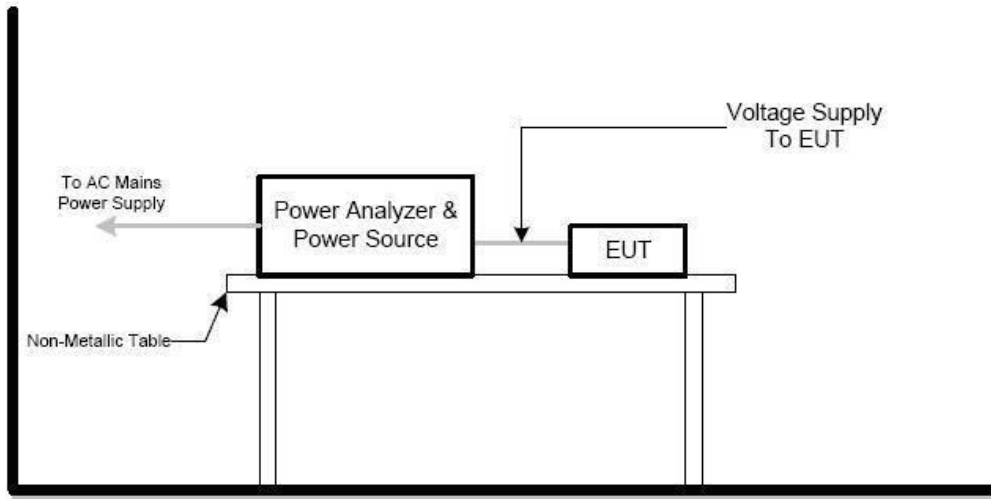
### 3.3.2 TEST PROCEDURE

- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions.
- b. The classification of EUT is according to section 5 of EN 61000-3-2. The EUT is classified as follows:  
Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.  
Class B: Portable tools. Portable tools.; Arc welding equipment which is not professional equipment.  
Class C: Lighting equipment.  
Class D: Equipment having a specified power less than or equal to 600W of the following types: Personal computers and personal computer monitors and television receivers.
- c. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

### 3.3.3 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

### 3.3.4 TEST SETUP





### 3.3.5 TEST RESULTS

Temperature:	26°C	Relative Humidity:	45%
Pressure:	1010hPa	Test Voltage:	N/A

*Note: The active input power of the EUT is less than 75W. No limits apply for equipment with an active input power up to and including 75W*





### 3.4 VOLTAGE FLUCTUATION AND FLICKERS

#### 3.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKERS

Tests	Measurement Value	Limit	Descriptions
	IEC555-3	IEC/EN 61000-3-3	
$P_{st}$	$\leq 1.0, T_p= 10 \text{ min.}$	$\leq 1.0, T_p= 10 \text{ min.}$	Short Term Flicker Indicator
$P_{lt}$	N/A	$\leq 0.65, T_p=2 \text{ hr.}$	Long Term Flicker Indicator
$T_{dt(s)}$	$\leq 3\%$	$\leq 3.3\%$	Relative Steady-State V-Chang
$d_{max}(\%)$	$\leq 4\%$	$\leq 4\%$	Maximum Relative V-Chang
$d_c(\%)$	N/A	$\leq 3.3\%$ for $> 500 \text{ ms}$	Relative V-change Characteristic

#### 3.4.2 TEST PROCEDURE

a. Harmonic Current Test:

Test was performed according to the procedures specified in Clause 5.0 of IEC555-2 and/or Sub-clause 6.2 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.

b. Fluctuation and Flickers Test:

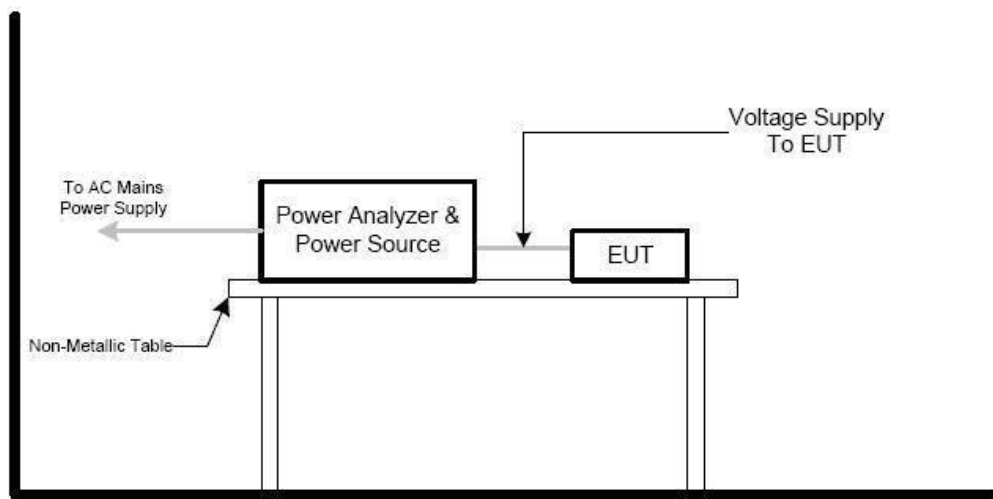
Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 5.0/6.0 of IEC555-3 and/or Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

c. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

#### 3.4.3 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 3.4.4 TEST SETUP





### 3.4.5 TEST RESULTS

Temperature:	25°C	Relative Humidity:	45%
Pressure:	1010hPa	Test Voltage:	AC 230V/50Hz

Test Parameter	Measurement Value	Limit	Remarks
$P_{st}$	0.14	1.0	Pass
$P_{lt}$	--	0.65	--
$T_{dt(s)}$	0.00	0.5	Pass
$d_{max}(\%)$	0.00%	4%	Pass
$d_c(\%)$	0.00%	3.3%	Pass





### 4. EMC IMMUNITY TEST

#### 4.1 GENERAL PERFORMANCE CRITERIA

##### 4.1.1 PERFORMANCE CRITERIA (GPS)

According to **EN 301 489-3** standard, the general performance criteria as following:

type 1		
Criteria	During the test	After the test
<b>A</b>	Operate as intended No loss of function For equipment with primary function type II the minimum performance shall be 12 dB SINAD  No unintentional responses	Operate as intended For equipment with primary function type II the communication link shall be maintained No loss of function No degradation of performance No loss of stored data or user programmable functions
<b>B</b>	May be loss of function (one or more) No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
Note: please refer to EN301 489-3 clause 6.3.		

##### 4.1.2 PERFORMANCE CRITERIA (GSM/WCDMA)

According to **EN 301489 -7** standard, the general performance criteria as following:

#### PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO TRANSMITTERS (CT)

A communication link shall be established at the start of the test, and maintained during the test, see clauses 4.2.2 to 4.2.5.

During the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.



### **PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO TRANSMITTERS (TT)**

A communications link shall be established at the start of the test, see clauses 4.2.2 to 4.2.5. At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

### **PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO RECEIVERS (CR)**

A communications link shall be established at the start of the test, clauses 4.2.1 to 4.2.4.

During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence.

During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.

### **PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO RECEIVERS (TR)**

A communications link shall be established at the start of the test, clauses 4.2.1 to 4.2.4.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

According to **EN 301489 -24** standard.

### **PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA TO WCDMA**

In the speech mode, the performance criteria shall be that the Up Link and Down Link speech output levels shall be at least 35 dB less than the recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz.

### **PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA TO WCDMA**

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

In addition to confirming the above performance in traffic mode, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.



#### 4.1.3 PERFORMANCE CRITERIA (Bluetooth/WIFI)

According to **EN 301489 -17** standard, the general performance criteria as following:

Criteria	During the test	After the test
A	Shall operate as intended May show degradation of performance (see note 1) Shall be no loss of function Shall be no unintentional transmissions	Shall operate as intended Shall be no degradation of performance (see note 2) Shall be no loss of function Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more) May show degradation of performance (see note 1) No unintentional transmissions	Functions shall be self-recoverable Shall operate as intended after recovering Shall be no degradation of performance (see note 2) Shall be no loss of stored data or user programmable functions
C	May be loss of function (one or more)	Functions shall be recoverable by the operator Shall operate as intended after recovering Shall be no degradation of performance (see note 2)

NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: no degradation of performance after the test is understood as any degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.



## PERFORMANCE FOR TT

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

## PERFORMANCE FOR TR

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

## PERFORMANCE FOR CT

The performance criteria A shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an Acknowledgement (ACK) or Not Acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

## PERFORMANCE FOR CR

The performance criteria A shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

### 4.1.4 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.



## 4.2 ESD TESTING

### 4.2.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance:	B
Discharge Voltage:	Air Discharge: 2KV/4KV/8KV (Direct) Contact Discharge: 2KV/4KV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

### 4.2.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT. During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.

If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.

Horizontal Coupling Plane (HCP):

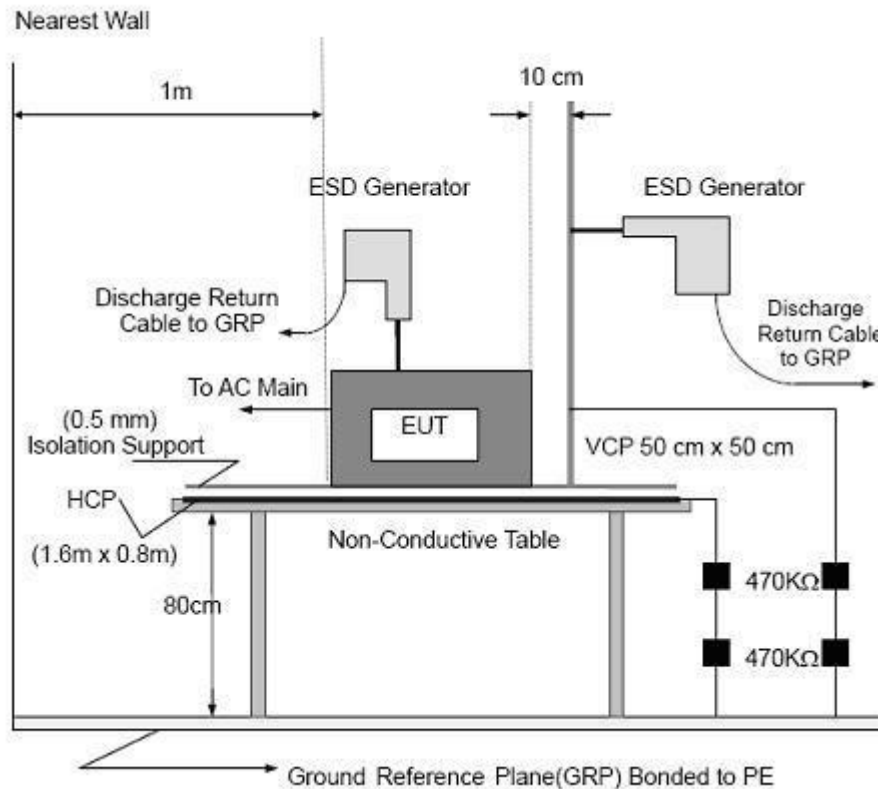
The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.

- b. Air discharges at insulation surfaces of the EUT.

It was at least ten single discharges with positive and negative at the same selected point.

### 4.2.3 TEST SETUP



Note:

#### TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

#### FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

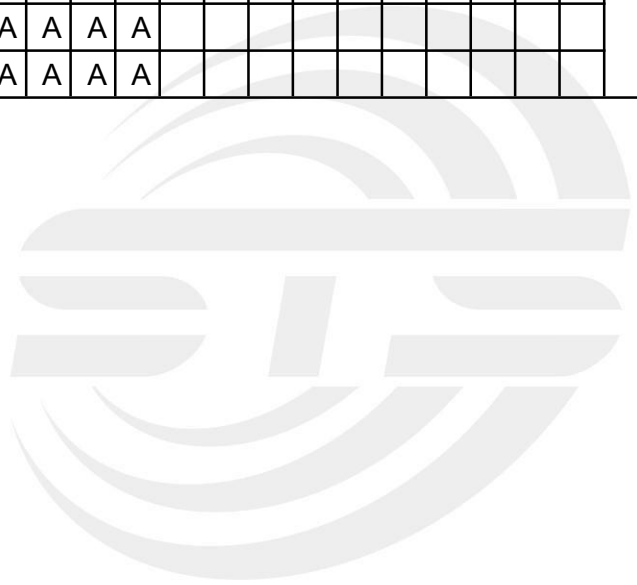






**GSM/GPRS/EDGE TEST RESULT**

Mode	Air Discharge								Contact Discharge								Observation	Criterion	Result
	2		4		8		15		2		4		6		8				
Test level (KV)	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-			
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-			
HCP									A	A	A	A					TT,TR	B	PASS
VCP									A	A	A	A							PASS
Metal									A	A	A	A							PASS
Keying	A	A	A	A	A	A													PASS
Charge Port	A	A	A	A	A	A													PASS
Crevice	A	A	A	A	A	A													PASS
Headphone	A	A	A	A	A	A													PASS
Rear camera	A	A	A	A	A	A													PASS



The Photo for Discharge Points of EUT







Red dot —Air Contact Discharged  
Blue Dot —Contact Discharged



## 4.3 RS TESTING

### 4.3.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance:	A
Frequency Range:	80 MHz - 1000 MHz, 1400 MHz - 2700 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

### 4.3.2 TEST PROCEDURE

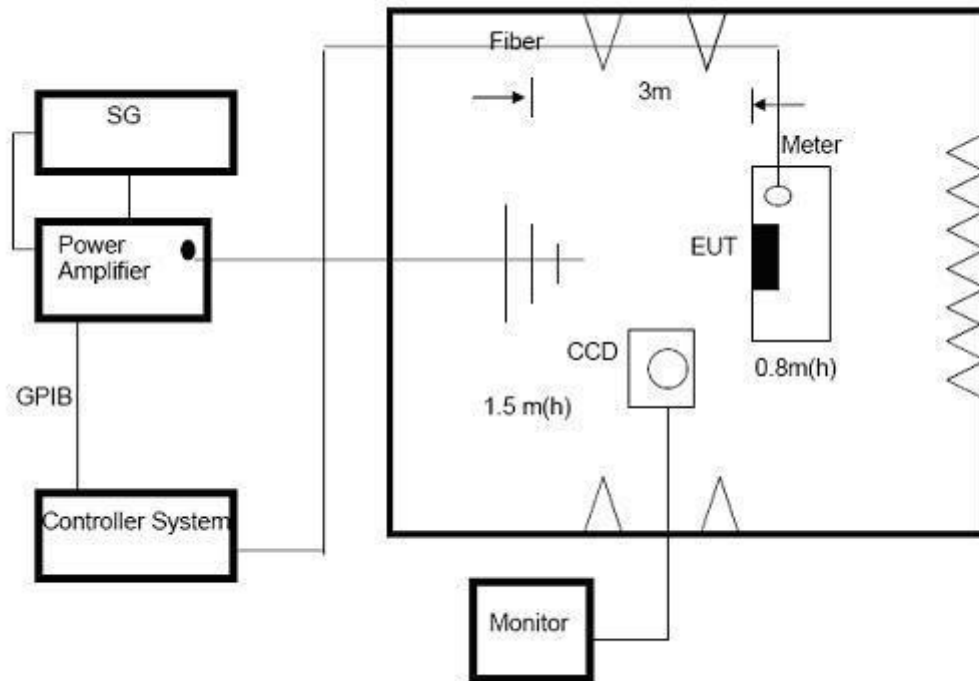
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

The other condition as following manner:

- a. The frequency range is swept from 80 MHz to 1000 MHz, & 1400MHz - 2700MHz with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- b. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- c. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

### 4.3.3 TEST SETUP



Note:

#### TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

#### FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

**4.3.4 TEST RESULTS**

Temperature:	22°C	Relative Humidity:	49%
Pressure:	1010hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Mode 1/2/3/4/5/6/7/8/9/10/11/12/13/14		

**GSM/WCDMA Uplink/Downlink**

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results	Judgment
80-6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	<b>CT,CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
			Rear				
			Left				
			Right				

Note: During the test, the Maximum Bit Error Ratio was less than  $1 \times 10^{-3}$ , the Uplink/Downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

The RXQUAL of the downlink is not exceeding the value of three, measured during each individual exposure in the test sequence. Or During and after the test, the apparatus continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

**GPRS/EDGE Uplink/Downlink**

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results	Judgment
80-6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	<b>CT,CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
			Rear				
			Left				
			Right				

During the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

During the test, the Maximum Bit Error Ratio was less than  $1 \times 10^{-3}$



**HSDPA/HSUPA Uplink/Downlink**

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results	Judgment
80-6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	<b>CT,CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
			Rear				
			Left				
			Right				

In the speech mode, the performance criteria shall be that the Up Link and Down Link speech output levels shall be at least 35 dB less than the recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz .

During the test, the Maximum Block Error Ratio was less than  $1 \times 10^{-2}$

**BT Link**

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results	Judgment
80-6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	<b>CT,CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
			Rear				
			Left				
			Right				

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

**WIFI Link**

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results	Judgment
80-6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	<b>CT,CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
			Rear				
			Left				
			Right				

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

**GPS Link**

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results	Judgment
80-6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	<b>CT,CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
			Rear				
			Left				
			Right				

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

*Note:*

- 1) *N/A - denotes test is not applicable in this test report.*
- 2) *Criteria A: There was no change operated with initial operating during the test.*
- 3) *Criteria B: The EUT function loss during the test, but self-recoverable after the test.*
- 4) *Criteria C: The system shut down during the test.*



## 4.4 EFT/BURST TESTING

### 4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-4
Required Performance:	B
Test Voltage:	Power Line: 1 KV Signal/Control Line: 0.5 KV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 2 min.

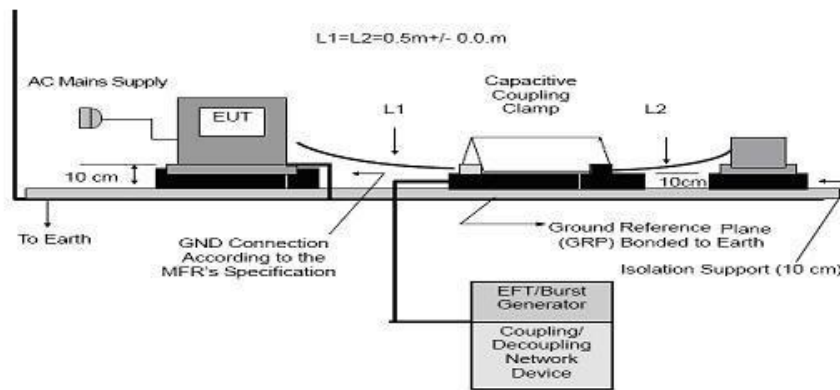
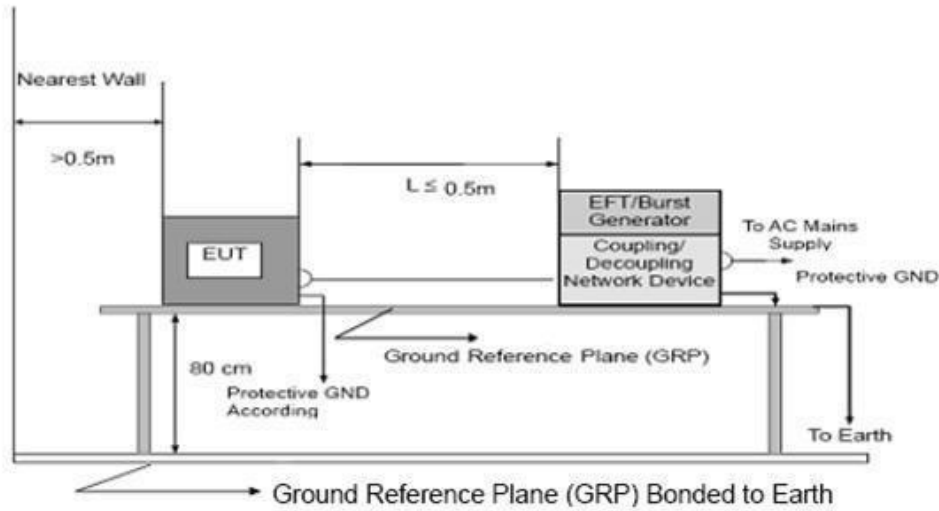
### 4.4.2 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m\*1m min and 0.65mm thick min.

The other condition as following manner:

- ~ The length of power cord between the coupling device and the EUT should not exceed 1 meter.
- ~ Both positive and negative polarity discharges were applied.
- ~ The duration time of each test sequential was 2 minute

### 4.4.3 TEST SETUP



Note:

#### TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

#### FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.



**4.4.4 TEST RESULTS**

Temperature:	22°C	Relative Humidity:	49%
Pressure:	1010hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Mode 1/2/3/4/5/6/7/8/9/10/11/12/13/14		

**WIFI/BT/GPS TEST RESULT**

Coupling Line		Test level (KV)								Observation	Criterion	Result
		0.5		1		2		4				
		+	-	+	-	+	-	+	-			
AC line	L	A	A	A	A					TT,TR	B	PASS
	N	A	A	A	A							PASS
	PE											
	L+N	A	A	A	A							PASS
	L+PE											
	N+PE											
	L+N+PE											
DC Line												
Signal Line												

**WCDMA/HSDPA/HSUPA TEST RESULT**

Coupling Line		Test level (KV)								Observation	Criterion	Result
		0.5		1		2		4				
		+	-	+	-	+	-	+	-			
AC line	L	A	A	A	A					TT,TR	B	PASS
	N	A	A	A	A							PASS
	PE											
	L+N	A	A	A	A							PASS
	L+PE											
	N+PE											
	L+N+PE											
DC Line												
Signal Line												



**GSM/GPRS/EDGE TEST RESULT**

Coupling Line		Test level (KV)								Observation	Criterion	Result
		0.5		1		2		4				
		+	-	+	-	+	-	+	-			
AC line	L	A	A	A	A					TT,TR	B	PASS
	N	A	A	A	A							PASS
	PE											
	L+N	A	A	A	A							PASS
	L+PE											
	N+PE											
	L+N+PE											
DC Line												
Signal Line												

Note:

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this test report
- 3) There was not any unintentional transmission in standby mode



## 4.5 SURGE TESTING

### 4.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-5
Required Performance:	B
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power line ~ line to line: 1 KV line to ground: 2 KV Telecommunication line: 1 KV
Surge Input/Output:	L-N, L-PE, N-PE
Generator Source:	(L-N)2 ohm between networks
Impedance:	(L-PE, N-PE)12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0 /90/180/270°
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

### 4.5.2 TEST PROCEDURE

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on

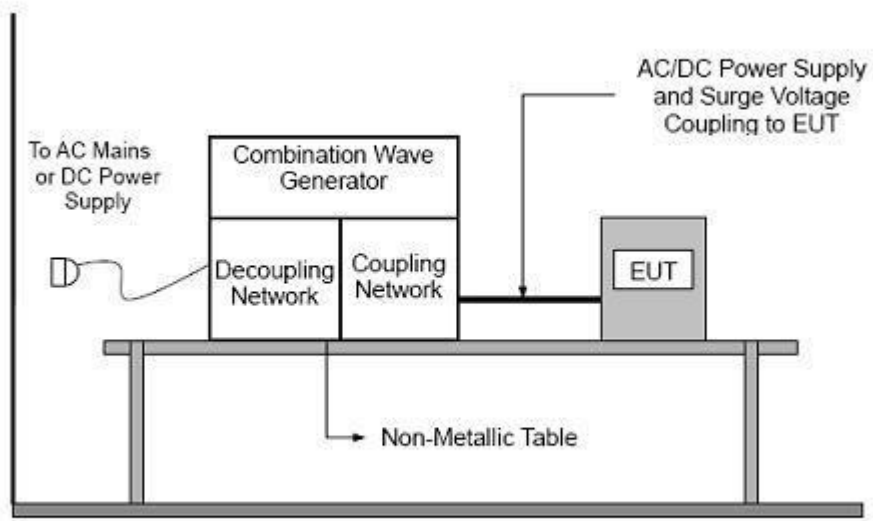
b. equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2meters in length (or shorter).

c. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge is applied to the lines via the capacitive coupling. The coupling /decoupling

d. networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

### 4.5.3 TEST SETUP







**4.5.4 TEST RESULTS**

Temperature:	22°C	Relative Humidity:	49%
Pressure:	1010hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Mode 1/2/3/4/5/6/7/8/9/10/11/12/13/14		

**WIFI/BT/GPS TEST RESULT**

Coupling Line			Test level								Observation	Criterion	Result
			0.5 KV		1 KV		2 KV		4 KV				
			+	-	+	-	+	-	+	-			
AC line	L-N	0°	A	A	A	A					TT,TR	B	PASS
		90°	A	A	A	A							
		180°	A	A	A	A							
		270°	A	A	A	A							
	L-PE	0°											
		90°											
		180°											
		270°											
	N-PE	0°											
		90°											
		180°											
		270°											
DC Line													
Signal Line													



**WCDMA/HSDPA/HSUPA TEST RESULT**

Coupling Line			Test level								Observation	Criterion	Result
			0.5 KV		1 KV		2 KV		4 KV				
			+	-	+	-	+	-	+	-			
AC line	L-N	0°	A	A	A	A					TT,TR	B	PASS
		90°	A	A	A	A							
		180°	A	A	A	A							
		270°	A	A	A	A							
	L-PE	0°											
		90°											
		180°											
		270°											
	N-PE	0°											
		90°											
		180°											
		270°											
DC Line													
Signal Line													



**GSM/GPRS/EDGE TEST RESULT**

Coupling Line			Test level								Observation	Criterion	Result
			0.5 KV		1 KV		2 KV		4 KV				
			+	-	+	-	+	-	+	-			
AC line	L-N	0°	A	A	A	A					TT,TR	B	PASS
		90°	A	A	A	A							
		180°	A	A	A	A							
		270°	A	A	A	A							
	L-PE	0°											
		90°											
		180°											
		270°											
	N-PE	0°											
		90°											
		180°											
		270°											
DC Line													
Signal Line													

Note:

- 1) Polarity and Numbers of Impulses : 5 Pst / Ngst at each tested mode
- 2) N/A - denotes test is not applicable in this Test Report
- 3) There was not any unintentional transmission in standby mode



## 4.6 INJECTION CURRENT TESTING

### 4.6.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance:	A
Frequency Range:	0.15 MHz - 80 MHz
Field Strength:	3 Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	at least 3 seconds

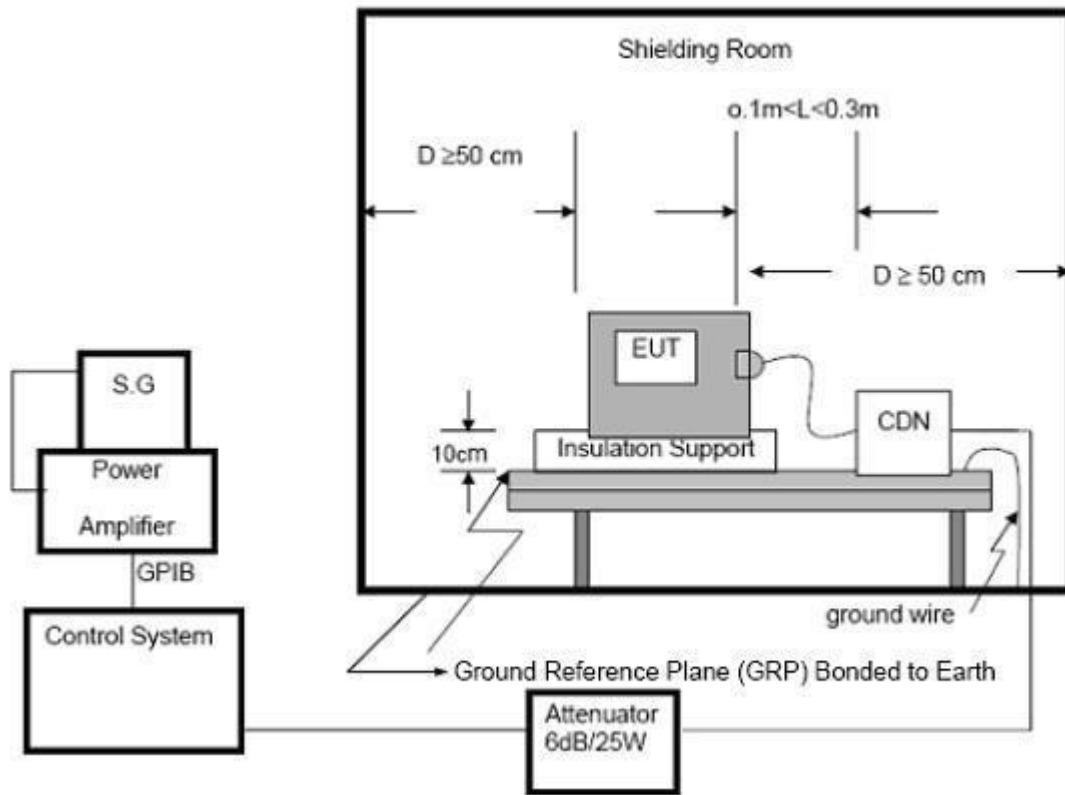
### 4.6.2 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m\*1m min. and 0.65mm thick min.

The other condition as following manner:

- The frequency range is swept from 150 KHz to 80 MHz, with the signal 80%amplitude
- modulated with a 1kHz sine wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
  - The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

### 4.6.3 TEST SETUP



**NOTE:**

**FLOOR-STANDING EQUIPMENT**

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

**4.6.4 TEST RESULTS**

Temperature:	22°C	Relative Humidity:	49%
Pressure:	1010hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Mode 1/2/3/4/5/6/7/8/9/10/11/12/13/14		

**GSM/WCDMA Uplink/Downlink**

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	Observation	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	<b>CT, CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
Input/ Output DC. Power Port	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
Signal Line	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>

Note: During the test, the Maximum Bit Error Ratio was less than  $1 \times 10^{-3}$ . "A" stand for, the uplink/downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). The RXQUAL of the downlink is not exceeding the value of three, measured during each individual exposure in the test sequence. Or During and after the test, the apparatus continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level.

**GPRS/EDGE/HSDPA/HSUPA Uplink/Downlink**

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	Observation	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	<b>CT, CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
Input/ Output DC. Power Port	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
Signal Line	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>

Note: During the test, the Maximum Bit Error Ratio was less than  $1 \times 10^{-3}$   
During the test, the Maximum Block Error Ratio was less than  $1 \times 10^{-2}$

**WIFI Link**

Test Ports (Mode)	Freq. Range MHz)	Field Strength	Observation	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	<b>CT, CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
Input/ Output DC. Power Port	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
Signal Line	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

**BT Link**

Test Ports (Mode)	Freq. Range MHz)	Field Strength	Observation	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	<b>CT, CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
Input/ Output DC. Power Port	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
Signal Line	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

**GPS Link**

Test Ports (Mode)	Freq. Range MHz)	Field Strength	Observation	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	<b>CT, CR</b>	<b>A</b>	<b>A</b>	<b>PASS</b>
Input/ Output DC. Power Port	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
Signal Line	0.15 --- 80		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

## 4.7 VOLTAGE INTERRUPTION/DIPS TESTING

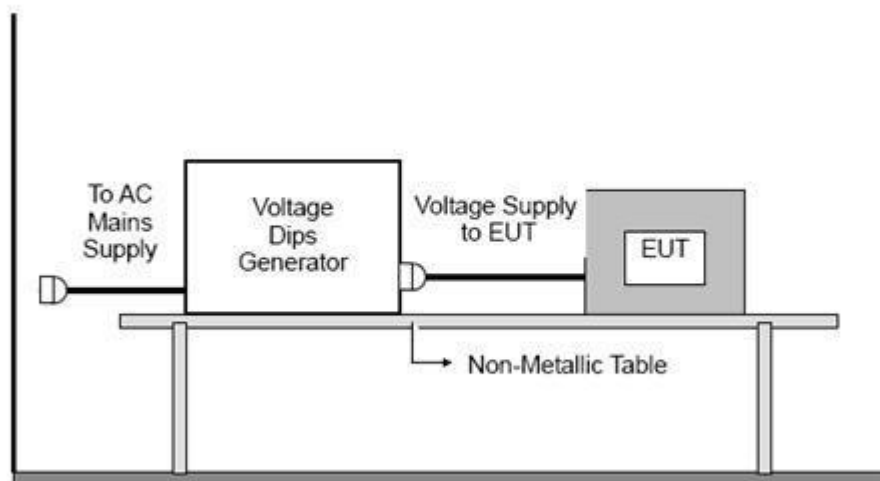
### 4.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-11
Required Performance:	B (For 100% Voltage Dips, 0.5 Cycle) B (For 100% Voltage Dips, 1 Cycle) C (For 30% Voltage Dips, 25 Cycles) C (For 100% Voltage Interruptions, 250 Cycles)
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

### 4.7.2 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

### 4.7.3 TEST SETUP





**4.7.4 TEST RESULTS**

Temperature:	22℃	Relative Humidity:	49%
Pressure:	1010hPa	Test Voltage :	AC 230V/50Hz
Test Mode:	Mode 1/2/3/4/5/6/7/8/9/10/11/12/13/14		

**WIFI/BT TEST RESULT**

Voltage Reduction	Duration (ms)	Observation	Perform Criteria	Results	Judgment
Voltage dip 0%	10	TT, TR	B	B	PASS
Voltage dip 0%	20	TT, TR	C	B	PASS
Voltage dip 70%	500	TT, TR	C	B	PASS
Voltage interruptions	5000	TT, TR	C	B	PASS

**FM/GPS TEST RESULT**

Voltage Reduction	Duration (ms)	Observation	Perform Criteria	Results	Judgment
Voltage dip 0%	10	TT, TR	B	B	PASS
Voltage dip 0%	20	TT, TR	B	B	PASS
Voltage dip 40%	100	TT, TR	B	B	PASS
Voltage dip 70%	10, 500	TT, TR	B	B	PASS
Voltage interruptions	5000	TT, TR	B	B	PASS

**WCDMA/HSDPA/HSUPA TEST RESULT**

Voltage Reduction	Duration (ms)	Observation	Perform Criteria	Results	Judgment
Voltage dip 0%	10	TT, TR	B	B	PASS
Voltage dip 0%	20	TT, TR	C	B	PASS
Voltage dip 70%	500	TT, TR	C	B	PASS
Voltage interruptions	5000	TT, TR	C	B	PASS

**GSM/GPRS TEST RESULT**

Voltage Reduction	Duration (ms)	Observation	Perform Criteria	Results	Judgment
Voltage dip 0%	10	TT, TR	B	B	PASS
Voltage dip 0%	20	TT, TR	C	B	PASS
Voltage dip 70%	10, 500	TT, TR	C	B	PASS
Voltage interruptions	5000	TT, TR	C	B	PASS

**USB TEST RESULT**

Voltage Reduction	Duration (ms)	Observation	Perform Criteria	Results	Judgment
Voltage dip 0%	10	TT, TR	B	B	PASS
Voltage dip 0%	20	TT, TR	C	B	PASS
Voltage dip 70%	500	TT, TR	C	B	PASS
Voltage interruptions	5000	TT, TR	C	B	PASS

**PLAY MUSIC TEST RESULT**

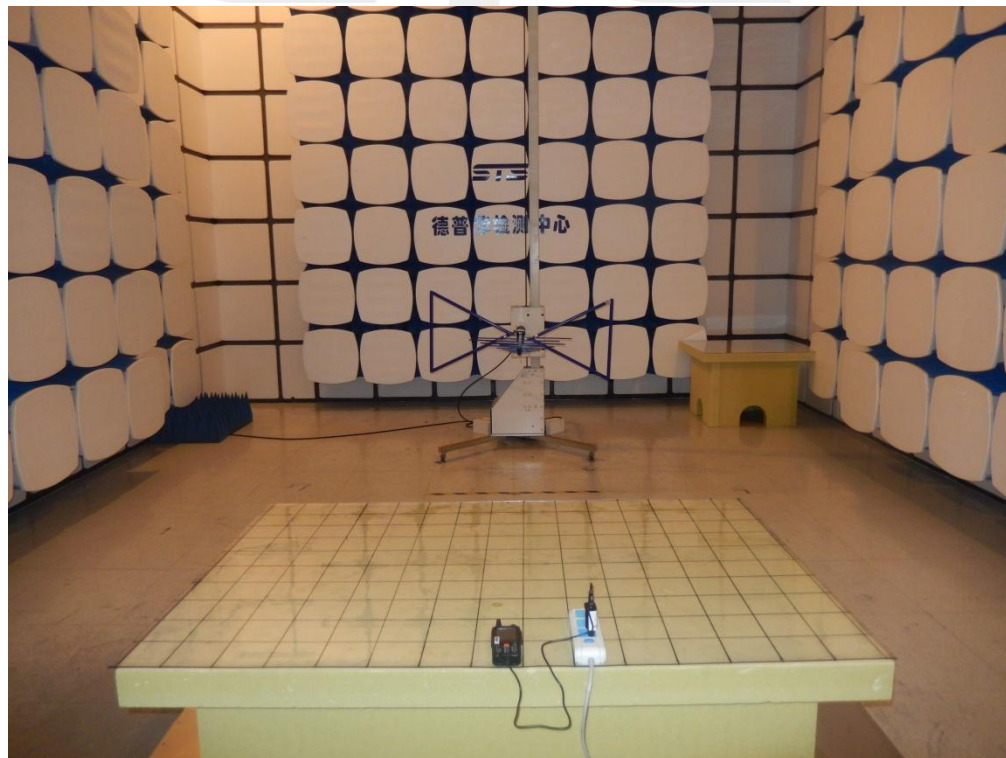
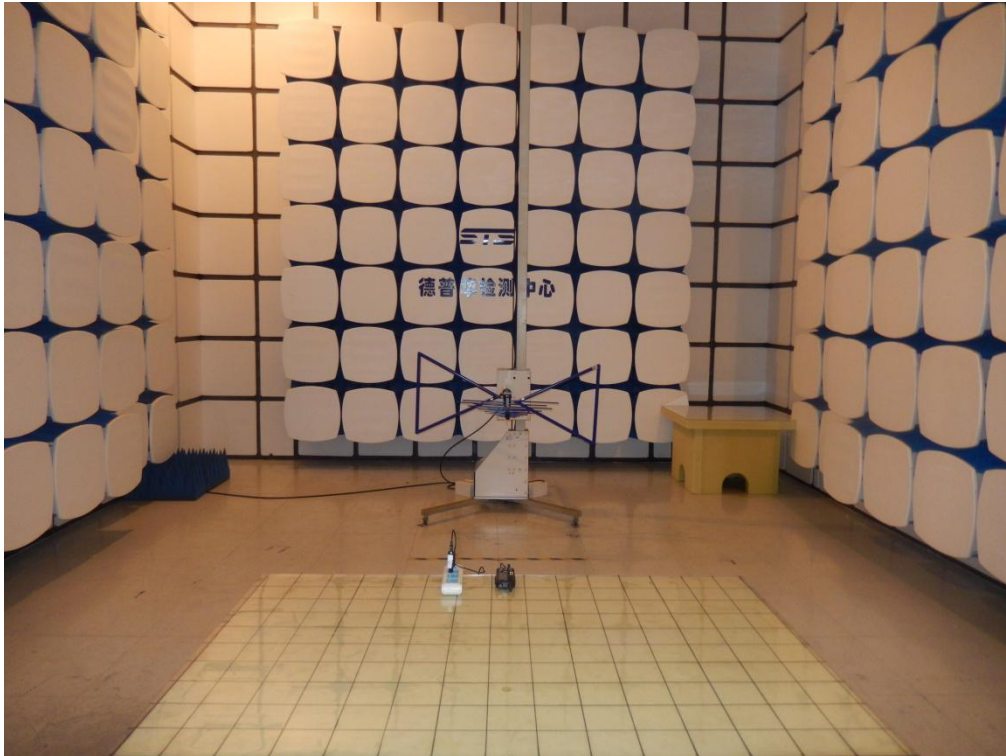
Voltage Reduction	Duration (ms)	Observation	Perform Criteria	Results	Judgment
Voltage dip 0%	10	TT, TR	B	B	PASS
Voltage dip 0%	20	TT, TR	C	B	PASS
Voltage dip 70%	500	TT, TR	C	B	PASS
Voltage interruptions	5000	TT, TR	C	B	PASS

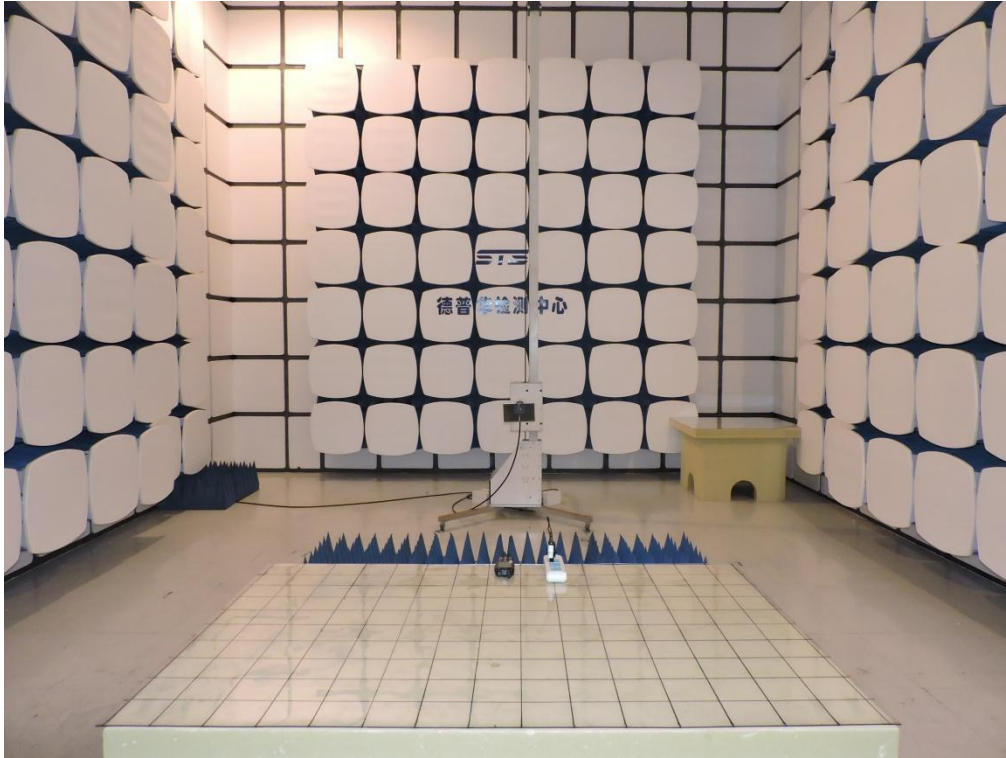
**CAMERA TEST RESULT**

Voltage Reduction	Duration (ms)	Observation	Perform Criteria	Results	Judgment
Voltage dip 0%	10	TT, TR	B	B	PASS
Voltage dip 0%	20	TT, TR	C	B	PASS
Voltage dip 70%	500	TT, TR	C	B	PASS
Voltage interruptions	5000	TT, TR	C	B	PASS

Note: 1) There was not any unintentional transmission in standby mode

## APPENDIX I-PHOTOGRAPHS OF EUT RE





CE

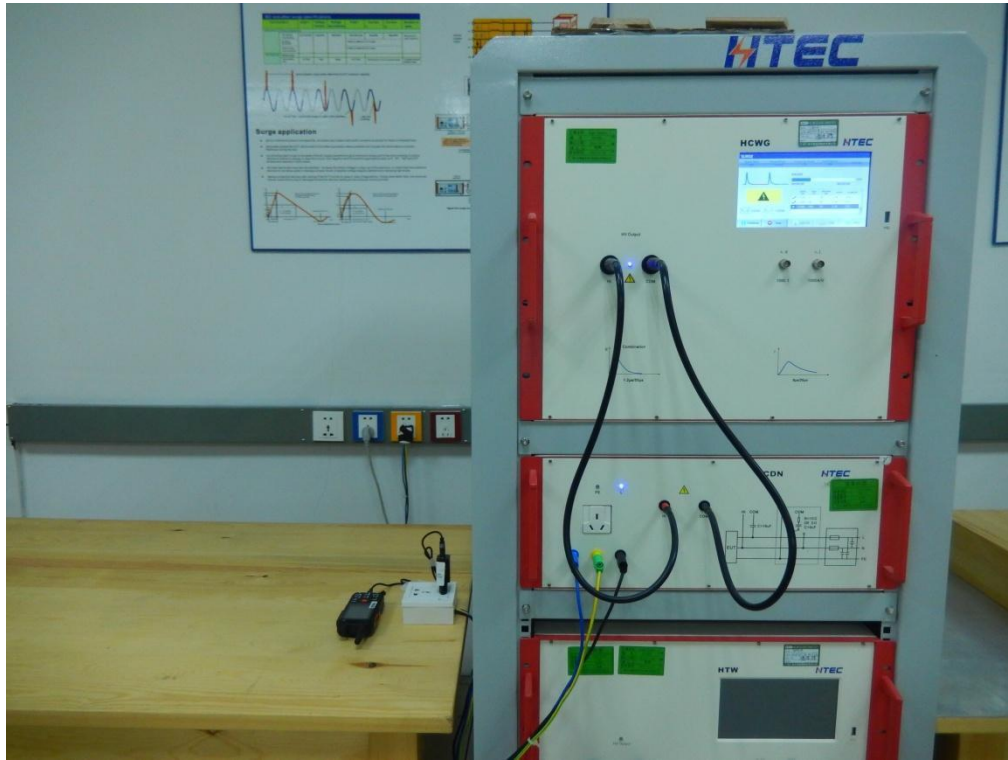




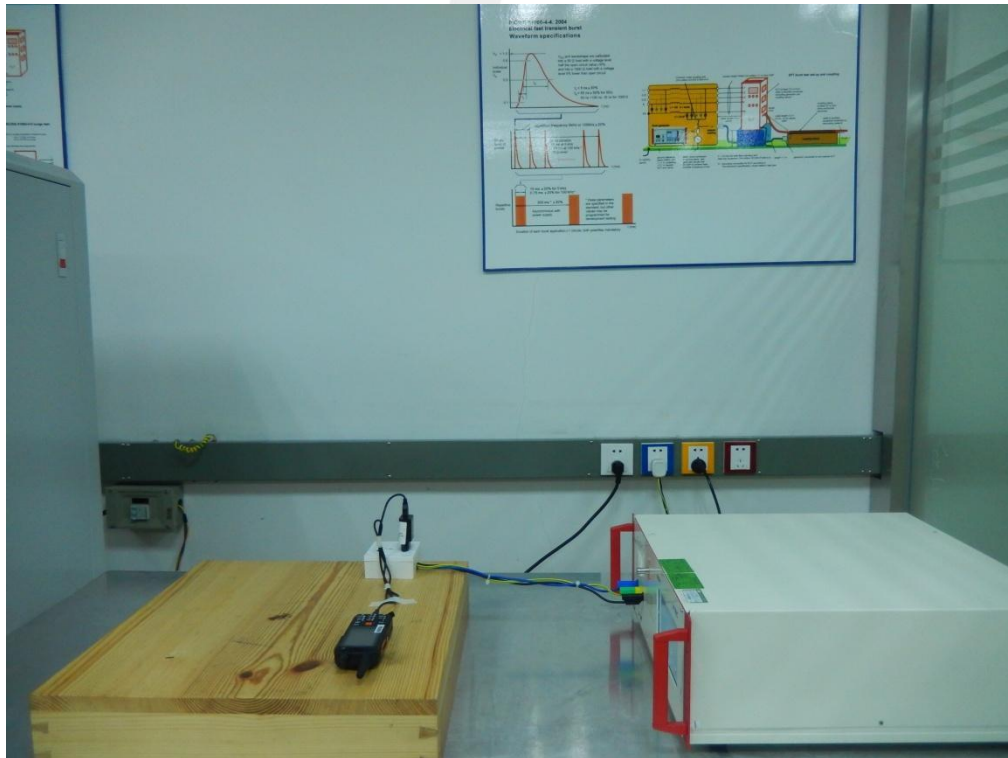
Flick



### SURGE



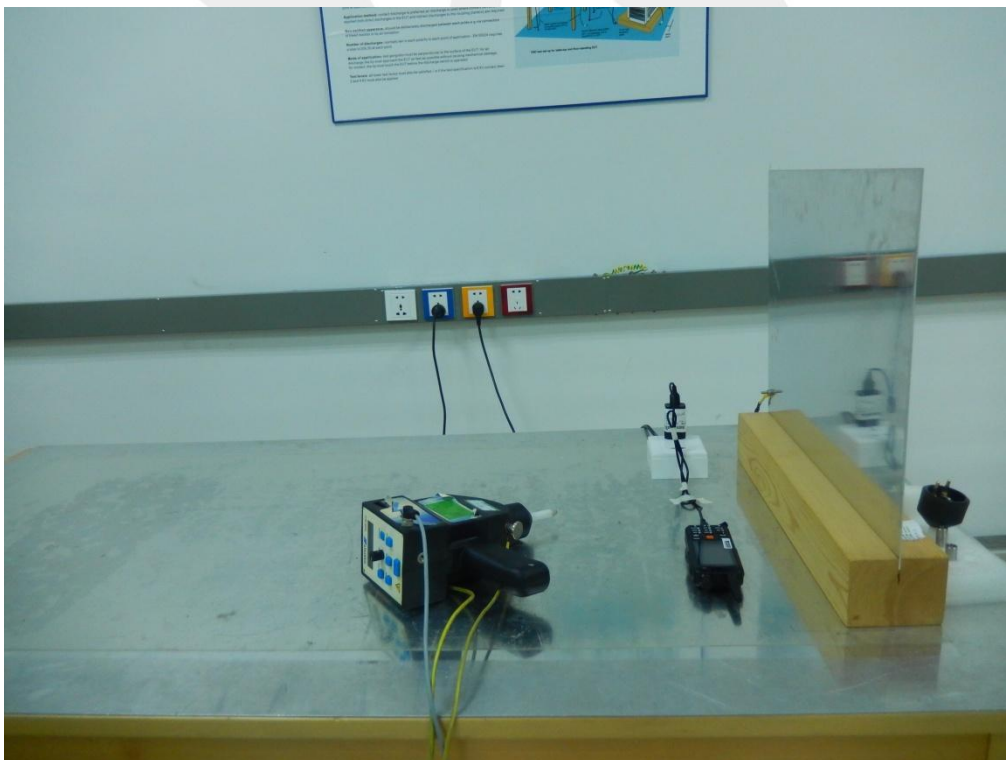
### EFT



### DIPS



### ESD



CS

